

(19) World Intellectual Property Organization
International Bureau(43) International Publication Date
31 January 2002 (31.01.2002)

PCT

(10) International Publication Number
WO 02/09485 A3(51) International Patent Classification⁷: **H05K 1/11**,
3/32, 3/06, 1/09, H01L 21/48, 21/60**Kenji** [JP/JP]; 866-3, Ohmachi, Saijo-shi, Ehime
793-0030 (JP). **OCHI, Hiroshi** [JP/JP]; 454-15, Hi-
nokuchi, Saijo-shi, Ehime 793-0043 (JP).

(21) International Application Number: PCT/JP01/06230

(22) International Filing Date: 18 July 2001 (18.07.2001)

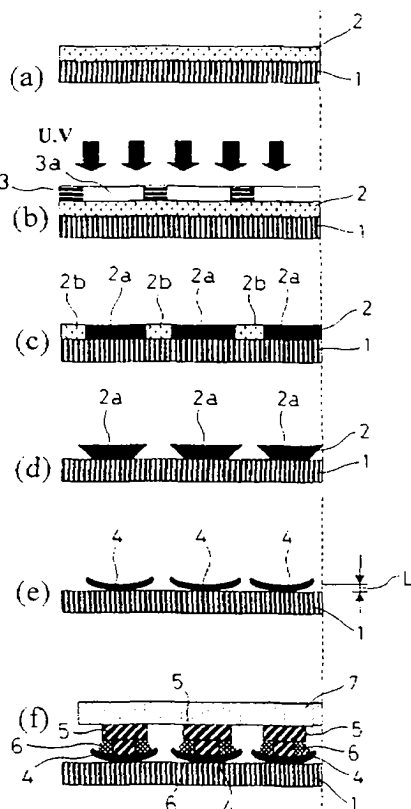
(74) Agent: **MORIMOTO, Yoshihiro**; All Nippon Air-
ways(Nishi-Hommachi)Bldg., 4th Floor, 10-10,
Nishi-Hommachi 1-chome, Nishi-ku, Osaka-shi, Os-
aka 550-0005 (JP).

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2000-219911 21 July 2000 (21.07.2000) JP(81) Designated States (*national*): CN, ID, KR, SG, US.(71) Applicant (*for all designated States except US*): **MAT-
SUSHITA ELECTRIC INDUSTRIAL CO., LTD.**
[JP/JP]; 1006, Oaza Kadoma, Kadoma-shi, Osaka
571-8501 (JP).(84) Designated States (*regional*): European patent (AT, BE,
CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC,
NL, PT, SE, TR).**Published:***with international search report*--- *before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments**[Continued on next page]*

(54) Title: FLIP CHIP PACKAGE, CIRCUIT BOARD THEREOF AND PACKAGING METHOD THEREOF



(57) **Abstract:** According to the present invention, when a semiconductor element (7) having protruding electrodes (5) formed thereon is connected to a circuit board (1) via conductive resin (6), stable connection is made even when an electrode pitch is small on the semiconductor element (7). On semiconductor element package regions on the circuit board (1), a paste electrode material (2) containing photopolymerizable materials is printed to form a film having a prescribed thickness, and this electrode material film (2) is baked after exposure and development thereof so as to obtain circuit electrodes (4) having edges warped in a direction of going apart from the circuit board (1) surface. Then, the protruding electrodes (5) and the concave surfaces of the circuit electrodes (4) are brought in abutment with each other and connected via the conductive resin (6) which surrounds the abutments between the respective electrodes and is held on the concave surfaces of the circuit electrodes (4). With this arrangement, the concave surfaces of the circuit electrodes (4) act as saucers and prevent the conductive resin (6) from being squeezed out, thereby eliminating possible occurrence of short circuits.

WO 02/09485 A3



(88) Date of publication of the international search report:

6 June 2002

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/JP 01/06230

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H05K1/11 H05K3/32 H05K3/06 H05K1/09 H01L21/48
H01L21/60

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H05K H01L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 049 480 A (NEBE ET AL.) 17 September 1991 (1991-09-17) column 12, line 30 -column 13, line 4 ---	1,2,5,6
A	EP 0 657 932 A (MATSUSHITA ELECTRIC IND CO LTD) 14 June 1995 (1995-06-14) column 9, line 2 - line 37; figure 1 ---	1,5,6
A	PATENT ABSTRACTS OF JAPAN vol. 1996, no. 12, 26 December 1996 (1996-12-26) & JP 08 222840 A (SUMITOMO METAL IND LTD;SUMITOMO KINZOKU ELECTRO DEVICE:KK), 30 August 1996 (1996-08-30) abstract --- -/--	1,4-6



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents:

A document defining the general state of the art which is not considered to be of particular relevance

E earlier document but published on or after the international filing date

L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

O document referring to an oral disclosure, use, exhibition or other means

P document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

Z document member of the same patent family

Date of the actual completion of the international search

20 March 2002

Date of mailing of the international search report

02/04/2002

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel: (+31-70) 340-2040, Tx: 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Mes, L

INTERNATIONAL SEARCH REPORT

Int. Application No

PCT/JP 01/06230

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>PATENT ABSTRACTS OF JAPAN vol. 1999, no. 09, 30 July 1999 (1999-07-30) & JP 11 121527 A (PFU LTD), 30 April 1999 (1999-04-30) abstract</p> <p>---</p>	1,5,6
A	<p>US 5 338 391 A (SUPPELSA ET AL.) 16 August 1994 (1994-08-16) abstract; figures</p> <p>-----</p>	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/JP 01/06230

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5049480	A	17-09-1991	NONE	
EP 0657932	A	14-06-1995	CN 1113607 A , B	20-12-1995
			CN 1221309 A	30-06-1999
			DE 69428181 D1	11-10-2001
			EP 0657932 A2	14-06-1995
			JP 7231050 A	29-08-1995
			US 5640051 A	17-06-1997
			US 5628919 A	13-05-1997
JP 08222840	A	30-08-1996	NONE	
JP 11121527	A	30-04-1999	NONE	
US 5338391	A	16-08-1994	NONE	